

Crystal ball questions on Conjugate acid/base pairs

All of the following questions have not (as yet!) appeared in the NCEA Level 2 Exams

1) The equation below illustrates the self ionisation of water.



Discuss conjugate acid base pairs in detail using the equation provided of self ionisation of water.

2) Discuss the meaning of the word “amphiprotic”, use different equations involving water and the hydrogen sulfate ion in your answer.

3) Write equations to show why sodium ethanoate (CH_3COONa) is basic, use the words conjugate acid/base pair in your answer.

4) A buffer is a solution that resists changes in pH. The pH of a buffer changes very little when small amounts of a strong acid or strong base are added to the buffer. A buffer consists of approximately equal amounts of a conjugate weak acid/weak base pair in equilibrium with each other.

A phosphate buffer can be made by dissolving NaH_2PO_4 and Na_2HPO_4 in water, in which NaH_2PO_4 produces the acidic ion and Na_2HPO_4 produces the conjugate base ion.

i) Write an equation the acid and conjugate base ions that make up the phosphate buffer

ii) Discuss, using both equations and equilibrium principles how the phosphate buffer minimizes the effect of the addition of a strong acid (H^+) and the addition of a strong base (OH^-)